

REMARKS

Claims 1-29 remain in the application.

35 USC 103 rejections

The Examiner has rejected claims 19 and 20 as being obvious over Wei et al in view of Masumura et al. Claim 19 has been cancelled, and claim 20 has been rewritten in independent form. Applicant respectfully traverses the rejection of claim 20 and requests reconsideration.

Wei's invention is directed to increasing film thickness measurement accuracy, either by determining the center of the measurement pad or by taking into account the effects of the surrounding material in analyzing the measurement data. The techniques are based on the assumption that there are surrounding materials of heights different from the measurement pad which affect the measurement accuracy. All figures and examples in Wei refer to film thickness measurement accuracy. The measurements at the five sites on the wafer shown in Tables 1 and 2 relate only to reproducibility of thickness measurements over 15 runs, rather than relating to the actual thickness uniformity of the thin film. Nowhere does Wei disclose determining the thickness difference between the center and the remaining locations, nor determining the thickness uniformity across the wafer portion from these at least five measurements. The calculational methods described in Wei col. 4, lines 55-60 (cited by the Examiner) are not utilized to determine the thickness difference between the center and the remaining locations, nor are they utilized to determine the thickness uniformity across the wafer portion. As stated in the abstract, Wei's measurements identify "the minimum or maximum of the curve (which) is then used to identify the center of the pad". There is no teaching or suggestion in Wei that the determination of

thickness uniformity across the wafer would be useful in improving the measurement accuracy. Therefore, although the data in Wei could be used to determine the thickness uniformity, that step is not present in Wei's method, nor is there any suggestion that the taking of such a step would be useful for Wei's purposes.

In contrast, an aspect of the present invention is directed to determining the uniformity of the actual thickness of the wafer remaining after milling. The formation of the thickness map does not require any thickness steps, and it is not directed to the measurement of thin films atop a wafer, as in Wei. In contrast to Wei, the instant application discloses and claims determining the thickness difference between the center and the remaining locations, and determining the thickness uniformity across the wafer portion from these at least five measurements. The present invention recognizes the need to accurately determine thickness uniformity across the wafer portion in order to achieve the very thin final thicknesses disclosed in the instant application.

Applicant further asserts that the combination of the Wei reference with the Masumura reference is improper, in that there is no teaching or suggestion in either Wei or Masumura that the polishing of the wafer portion to a mirror finish would yield thickness uniformity measurements of sufficient accuracy to thin the wafer portion to as little as 10 micron thickness.

In view of the above arguments, Applicant asserts that the method of the present invention disclosed in claim 20 is neither taught nor suggested by Wei or Masumura, alone or in combination. Applicant therefore respectfully requests that the 35 USC 103 rejection of claim 20 be withdrawn.

The Examiner has rejected claim 29 as being unpatentable over Wei in view of Dischiano. Applicant respectfully traverses this rejection and requests

reconsideration. Applicant notes that, on page 4 of the Office Action, the Examiner has cited Dischiano in reference to claim 20. Applicant's response assumes that the reference was meant to apply to claim 29, and requests confirmation of this assumption by the Examiner.

The mounting of Dischiano is directed toward supporting a flip chip die undergoing analysis such as circuit testing or debugging, including the possibility of milling, to provide added support and rigidity. In contrast, the apparatus of Wei is directed to simple optical measurements which do not involve grinding or milling. There is no implication or teaching in either Dischiano or Wei which would suggest combining the rigid mounting of Dischiano with the apparatus of Wei.

The present invention includes milling, and therefore requires a rigid mounting, i.e., the wafer portion mounted on a lapping puck and then positioned on the viewing stage for optical measurements. The apparatus disclosed and claimed in the instant application therefore includes both the mounting and the fixture positioned on the optical tool.

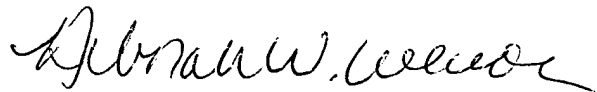
The Examiner states that Wei teaches a conventional high precision stage, and further asserts that "it is a well known fact in the art to utilize a puck in order to more efficiently hold the specimen during machining or measurement". Applicant asserts that a conventional high precision stage does not imply use of a lapping puck as claimed in the present invention. Many other types of sample mounting are standard, such as vacuum mounting. Wei does not mention use of a lapping puck, nor does he suggest the need for a rigid mounting. Applicant therefore asserts that Wei neither teaches, suggests, nor implies the use or need for a fixture as claimed in the instant application, alone or in combination with Dischiano.

It is not permissible to use hindsight to combine references. Since the combination of the rigid lapping puck mounting with the optical tool of the present apparatus is neither suggested nor implied by Wei or Dischiano, Applicant respectfully requests that the 35 USC 103 rejection of claim 29 be withdrawn.

To facilitate prosecution of the instant application, Applicant has rewritten claims 21 and 22 in independent form, also impacting claim 23 which depends on claim 22.

Applicant has made a diligent attempt to respond to all of the Examiner's points. It is believed that the application is now in condition for allowance. An early Notice is requested.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Deborah W. Wenocur".

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